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PERSONAL HABITS AND DIET IN RELATION TO PERIODONTAL
HEALTH AND ORAL HYGIENE STATUS IN SUBMARINERS

by

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Bureau of Medicine and Surgery, Navy Department
Research Work Unit MR005.19-6024

Released by:

Gerald J. Duffner, CAPT MC USN
COMMANDING OFFICER
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HEALTH AND ORAL HYGIENE STATUS IN SUBMARINERS**

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SUMMARY PAGE

THE PROBLEM

Some diary type reports have indicated that the frequency of food intake and the nature of foods eaten during submarine patrols change to an undesirable pattern from the standpoint of dental and general health. An objective assessment of these eating patterns and oral hygiene related to dental health was required in order to understand more fully the oral health status of submariners.

FINDINGS

The overall dietary habits of FBM submariners do not seem remarkable. The between meal snacks and the carbohydrate content of the diet are not abnormally high. The oral hygiene practices compare quite favorably with other groups studied.

APPLICATIONS

Data are presented which indicate but few areas for concern with regard to the dietary habits of FBM submariners with regard to maintaining good oral health. This essentially is a negative report.

ADMINISTRATIVE INFORMATION

This investigation was conducted as a part of Bureau of Medicine and Surgery Research Work Unit MR005.19-6024 — Effect of Stresses of Submarine Service on Oral Health. This report has been designated as Submarine Medical Research Laboratory Report No. 528. It is Report No. 3 on the Work Unit, and was approved for publication as of 24 May 1968.

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ABSTRACT

Some previous reports indicated that submarine crewmen eat abnormally high amounts of carbohydrates and that their diet habits include many between meal snacks. If true, these facts would lead one to expect great oral health problems in submariners; particularly in those on patrol for long periods. A detailed dietary and oral health study was done aboard the USS NATHAN HALE (SSBN 623) to evaluate the problem.

The findings essentially disprove the previously reported beliefs. It was found that the FBM crew ate an essentially well rounded diet with only a moderate amount of between meal snacking.

PERSONAL HABITS AND DIET IN RELATION TO PERIODONTAL HEALTH AND ORAL HYGIENE STATUS IN SUBMARINERS

INTRODUCTION

The oral health of submariners has long been a matter of concern (1, 2). During World War II an alarming incidence of gingivitis was reported (1). The present day conventional submariner is reported to show no great increase in gingivitis over his surface Navy counterpart (3); but there is room for great improvement in the submariner's oral health. This is particularly apparent when considering the isolated nature of the FBM submariner's duty.

Personal hygiene habits have been shown to be related to gingival health (4). Martin (2) reported that the diet of submariners with irregular meals and many sweets also probably contributed to the poor oral health. Carlsson and Egelberg (5) however, demonstrated that dental plaque can be formed even without the presence of readily fermentable carbohydrates in the diet, or when these carbohydrates are present only in small amounts. That dental debris (plaque) is related to dental caries and periodontal disease has been supported by many studies (3, 6, 7, 8, 9, 10, 11). Carlsson and Egelberg (5) found that if the diet was supplemented with frequent portions of glucose, the plaque did not significantly differ in amount or appearance from the plaque that was formed when the diet did not contain carbohydrate. On the other hand, they found that considerably larger amounts of plaque was formed if sucrose was consumed instead of glucose, and that this was probably the result of production of extracellular polysaccharides by plaque bacteria.

This present study was designed to discover some of the dietary habits of FBM submariners and to seek relationships between diet and dental disease and hygiene in the crew of an FBM submarine.

MATERIALS AND METHODS

Fifty enlisted subjects from the Gold Crew of the USS NATHAN HALE (SSBN 623) were chosen to participate in the study. They

were randomly selected from the sailing list. All subjects participated voluntarily. The study population represented a good cross-section of the personnel on board with respect to age, rate, and length of duty on FBM submarines.

Three oral examinations were conducted on each of the subjects; the first on the last day of the upkeep period; the second, after one week of patrol; and the third, at the end of the seventh week of the patrol. These examinations included the Russell periodontal index (10), and the Greene and Vermillion debris score (11). The examiner had been previously calibrated in the techniques of these examinations at the Dental Branch of the U. S. Naval Submarine Medical Center in New London, Connecticut.

The dietary habits and the personal oral hygiene practices of the subjects were discovered by means of two questionnaires. A detailed daily questionnaire (see Appendix 1) was administered for seven days preceding the first oral examination (i.e., the last 7 days of the refit period). This period was designated Test Period I. The daily questionnaire was again administered during the first seven days of the patrol (Test Period 2), and for seven consecutive days near the completion of the patrol (Test Period 3). A survey type questionnaire (see Appendix 2) based on the Antarctic health diary was administered weekly during the entire period of the study.

At the end of the patrol, the data were analyzed with the assistance of the Dental Branch at the Submarine Medical Center, New London, Conn.

RESULTS

The dietary habits of the studied population do not appear to be at all remarkable. Tables 1 through 8 give the results obtained from the daily questionnaires in each of the three test periods. The number of subjects who ate the regularly served meals during the test period is shown in Tables 1, 2 and 3.

Table 1
Average Number of Subjects Who Ate Regularly Served Breakfast

Test Period	Ate Meal	Did Not Eat Meal	No Response
1	28	20	2
2	29	19	2
3	32	18	

Table 4
Average Number of Subjects Who Ate Between Breakfast and Lunch

Test Period	Ate	Did Not Eat	No Response
1	8	38	4
2	7	38	5
3	7	39	4

Table 2
Average Number of Subjects Who Ate Regularly Served Noon Meal (Lunch)

Test Period	Ate Meal	Did Not Eat Meal	No Response
1	31	16	3
2	28	20	2
3	27	21	2

Table 5
Average Number of Subjects Who Ate Between Noon Meal and Evening Meal

Test Period	Ate	Did Not Eat	No Response
1	11	35	4
2	10	36	4
3	12	35	3

Table 3
Average Number of Subjects Who Ate Regularly Served Evening Meal

Test Period	Ate Meal	Did Not Eat Meal	No Response
1	36	10	4
2	31	15	4
3	26	22	2

$P < .05$

Table 6
Average Number of Subjects Who Ate After the Evening Meal

Test Period	Ate	Did Not Eat	No Response
1	31	16	3
2	33	14	3
3	32	17	1

It should be noted that watch schedules do not necessarily interfere with the availability of meals on the NATHAN HALE. The meal hours overlap the end and beginning of consecutive watches. Some enlisted personnel, however, eat only two meals per day, choosing to sleep through one meal per day. The evening meal and breakfast seem to be slightly more popular than the noon meal. The evening meal seems to lose some of its popularity as the patrol progresses. Chi square analyses of the data in Table 3 reveals a significant decrease in the number of men who ate the evening meal as the patrol progressed ($P < .05$).

Tables 4, 5 and 6 give the number of subjects who ate between meals. The frequency of between meal eating seems to increase throughout the day. Most of the subjects ate after the evening meal, and there was little variation throughout the patrol. "Mid-rats," the soup and sandwich meal served at about 1:00 A.M. explains this heavy trend to eat after the evening meal. Table 7 shows that the most heavily sampled items during all test periods were soup and sandwiches. The only time these items were available in quantity was at "mid-rats." Still, an average of 64% of the subjects ate after the evening meal, compared with the average of 14.3% in the period between breakfast and lunch, and an average of 22% between lunch and supper. An additional consideration to explain this variance is normal shipboard routine on the USS NATHAN HALE. The average enlisted man's time during the normal workday is often taken up with all-hands evolutions, drills, qualification procedures, and individual study. However, if he is not on watch, he may spend his evening in individual or group recreational activities. Many of these take place in the crews' mess area, and snack materials are often available.

Table 8 gives the items selected by the subjects who ate breakfast. This table and Table 7 show that "sweets" do not appear in the submariner's diet as frequently as suggested by Martin (2).

In Tables 9 through 20 are presented the results of the weekly questionnaire: eating and drinking habits section. The data in

Table 9 indicate that there is some reduction during the patrol in the amount of liquids ingested daily in the normally high intake group. In general, the men's appetite remained about the same (Table 10), but some individuals did report a decrement in appetite. A certain percentage of the men admitted to requiring liquids to "wash down" dry foods (Table 11). This did not change appreciably as the patrol progressed.

There is some increase in vitamin intake (Table 12). This was self-therapy; no vitamins were given out by the Medical Department. There is some tendency to a reduction in the between meal snacks as the patrol progressed (Table 13). There seems to be a decided tendency away from the ingestion of candy and/or soft drinks (Table 14). and a low prevalence of gum chewers (Table 15).

Table 16 shows that there are few cocoa drinkers (cocoa is readily available on the NATHAN HALE). There is a trend to increase the amount of coffee ingested per day as the patrol progresses (Table 17) but none of the subjects used more than two teaspoons of sugar with each cup of coffee (Table 18). More subjects drink their coffee without sugar than with sugar. Martin (2) reported that most submariners preferred their coffee with relatively large amounts of sugar. Table 19 shows that most of the subjects also preferred coffee without cream. "I'll have mine black and bitter" is an oft heard phrase on the NATHAN HALE.

The data in Table 20 indicates very little change in dietary preference as the patrol progresses. No trend toward a selection of starchy or sweet foods is seen.

The average daily toothbrushing frequencies are given in Table 21. Toothbrushing frequencies did not change significantly during the patrol. Interestingly, the frequency of brushing differed favorably and markedly from that found by Shiller (3) and Martin (2) in operational conventional submarine crews. Table 22 shows the average number of subjects brushing at various times of the day. There was no change in the time of day preferred for brushing during the patrol. It is interesting to note that

Table 7
Foods Selected for Between Meal Ingestion*

Food Selected	Between Breakfast and Noon Meal			Between Noon Meal and Evening Meal			After Evening Meal		
	Test Period	Test Period	Test Period	Test Period	Test Period	Test Period	Test Period	Test Period	Test Period
	1	2	3	1	2	3	1	2	3
Sweet Rolls	6	5	3	0	0	0	1	1	0
Candy	1	1	0	1	1	0	1	1	0
Cookies	0	0	1	0	0	2	2	0	2
Cake or Pie	0	0	1	2	1	2	3	5	6
Crackers	0	0	0	1	0	1	1	2	1
Peanut Butter	0	0	0	1	1	1	3	2	2
Fruit	1	1	1	1	1	0	2	1	1
Sandwich	0	0	0	1	1	1	19	23	16
Ice Cream	1	0	1	4	3	5	5	7	11
Nuts	0	0	0	1	0	1	0	0	3
Chewing Gum	1	1	1	1	2	1	2	3	2
Soup	0	0	0	0	0	0	8	13	7
Other	0	0	4	3	1	0	0	1	0

*Values represent the average number of men responding per day in each category rounded off to nearest whole number.

Table 8
Foods Selected by Those Subjects Who Ate Breakfast

Test Period	A Meat	Eggs	Toast	Fruit or Juice	Sweet Rolls	Cereal	Other
1 (N=28)	12	20	16	17	10	1	2
2 (N=29)	16	21	19	17	8	1	1
3 (N=32)	14	17	17	20	6	5	0

Table 9
Number of Cups of Liquid Drank per day, per man,
During Each Week of Study. (Question 1)

WEEK	20 or more	16	12	8	4 or less
1	12	9	14	12	1
2	14	6	10	15	2
3	12	7	11	16	2
4	7	9	11	20	2
5	9	7	10	23	0
6	8	10	11	19	0
7	7	10	19	13	0

Table 10
Subjective Evaluation of Appetite During Each Week of Study. (Question 2)

WEEK	Much Better Appetite	Better Appetite	Same Appetite	Worse Appetite	Much Worse Appetite
1	1	7	37	2	0
2	2	5	30	10	0
3	0	2	51	8	0
4	1	5	31	12	0
5	0	5	33	9	2
6	1	5	32	8	2
7	1	3	37	7	1

Table 11
Number of Subjects Who Required Liquids to Wash Down Dry Foods

WEEK	"All the Time"	"Almost Always"	"Sometimes"	"Almost Never"	"Never"
1	5	4	22	9	8
2	5	3	19	11	9
3	5	3	21	7	12
4	5	3	18	11	12
5	4	3	20	9	13
6	4	4	17	12	11
7	4	4	16	13	12

Table 12
Number of Subjects Taking Vitamins

WEEK	Took Vitamins	Did Not Take Vitamins
1	1	47
2	2	45
3	4	44
4	4	45
5	4	45
6	3	45
7	5	44

Table 13
Number of Subjects Who Ate Between Meals

WEEK	Each Day	Almost Everyday	Almost Never	Never	Other
1	5	19	23	1	
2	5	12	28	2	
3	3	15	26	3	
4	3	15	29	2	1
5	4	9	32	4	
6	4	12	28	4	
7	3	13	29	4	

Table 14
Number of Subjects Who Ate Candy or Drank Soft Drinks

WEEK	Each Day	Almost Everyday	Almost Never	Never
1	7	6	29	6
2	4	9	22	12
3	5	9	17	17
4	4	9	16	20
5	5	8	15	21
6	5	8	15	20
7	6	6	15	22

Table 15
Number of Subjects Who Chewed Gum

WEEK	Each Day	Almost Everyday	Almost Never	Never	Other
1	2	8	19	18	
2	1	10	9	27	
3	2	7	12	27	
4	2	6	15	25	1
5	2	5	16	26	
6	2	4	16	25	
7	2	4	16	27	1

Table 16
Number of Cups Per Day of Cocoa Drank by Subjects. (Question 8)

Week	5 or more	3-4/day	1-2/day	Less than 1/day	None
1	0	0	0	12	36
2	0	0	1	6	39
3	0	0	0	4	43
4	0	0	0	8	40
5	0	0	2	7	40
6	0	0	0	8	40
7	0	1	0	7	41

Table 17
Number of Cups/day of Coffee or Tea Consumed by Subjects. (Question 9)

Week	More than 10	9-10	7-8	5-6	3-4	1-2	Less than one	0
1	6	7	8	5	10	7	1	4
2	7	5	8	8	8	6	1	4
3	8	3	7	11	9	5	0	5
4	9	3	11	8	8	5	0	4
5	8	4	7	16	6	3	0	4
6	8	4	10	10	7	4	1	4
7	7	5	15	9	8	2	0	3

Table 18
**Amount of Sugar Used in Each Cup
of Coffee or Tea. (Question 10)**

Week	4 tsp	3 tsp	2 tsp	1 tsp	0
1	0	0	5	16	24
2	0	0	5	19	22
3	0	0	6	18	23
4	0	0	6	16	25
5	0	0	5	16	28
6	0	0	4	18	26
7	0	0	7	17	24

Table 19
**Relative Amounts of Cream Used in Each Cup
of Coffee or Tea. (Question 11)**

Week	Much	Moderate	Little	None	Other
1	0	9	3	33	
2	2	9	3	31	1
3	1	10	4	32	
4	1	7	7	32	
5	1	8	6	34	
6	1	8	6	33	
7	1	9	6	32	

Table 20
Results of question "If you could order dinner from (this) menu,
what would your choices be?"

WEEK —	1	2	3	4	5	6	7
APPETIZER							
Kadota figs	3	6	4	4	5	5	4
Seafood cocktail	35	36	38	41	37	36	37
Herring with sour cream	3	2	3	0	4	4	4
SALAD							
Tomato aspic	16	13	16	17	16	17	16
Avacado	16	17	15	17	17	17	18
Red kidney bean	11	14	15	13	14	12	12
SOUP							
Cream of tomato	13	16	15	17	21	14	14
Beef Broth	23	20	21	23	18	20	26
Potato	8	9	10	9	10	13	7
ENTREE							
Spaghetti	22	24	26	25	24	22	27
Cold cuts	15	14	15	16	16	15	14
Pork sausage	7	7	6	8	9	10	7
VEGETABLES							
2 CHOICES							
Rice	8	8	6	9	10	8	9
Spinach	15	15	18	11	11	13	13
Carrot	7	5	3	7	7	7	5
Cabbage	5	8	7	10	11	8	8
Corn	29	24	26	24	23	29	28
Broccoli	10	15	13	16	16	16	16
Potato	7	8	12	12		7	10
BEVERAGE							
Black coffee	20	22	22	25	27	26	26
Coffee with sugar	16	15	13	15	14	13	15
Coffee with cream	5	7	10	6	7	5	6
Coffee with cream & sugar	2	1				1	
DESSERT							
Banana pudding	28	31	28	29	26	31	29
Assorted cheeses	11	9	13	13	14	10	12
Assorted nuts	6	5	5	5	9	6	7

Table 21
Average Daily Toothbrushing Frequencies
(Average of six days for each period)

	Prepatrol period (N-50)	On patrol 1 week (N-50)	Near end of patrol (N-50)
Did not brush	1	1	1
Brushed once	13	13	14
Brushed twice	18	19	18
Brushed three times	12	12	11
Brushed four times	6	4	6
Brushed five times	0	1	0

Table 22
Average Number of Subjects Brushing at Various
Times of the Day
(Average of 6 days for each period)

	Prepatrol period	On patrol 1 week	Near end of patrol
Before breakfast	10	10	8
After breakfast	18	17	17
Mid-morning	6	4	5
Before lunch	2	3	4
After lunch	19	16	15
Mid-afternoon	3	6	4
Before dinner	3	3	5
After dinner	21	19	18
Before bedtime	24	25	25

Table 23
Average Brushing Habits. (Question 26)

WEEK	Seldom	Usually Once Each Day	At Least Once Each Day	Twice A Day	3 Or More Times Each Day
1	0	4	12	17	12
2	0	5	11	17	12
3	0	6	10	17	14
4	0	3	15	19	12
5	0	5	12	19	13
6	0	5	13	17	12
7	0	6	16	14	12
Conventional Submariner (Shiller)	10	90	73	47	14

Table 24
Cigarette Smoking Habits of Studied Group. (Question 19)

WEEK	More Than 2 Packs Per Day	More Than 1 Pack Per Day	1 Pack Per Day	½ Pack Per Day	Less Than ½ Pack Per Day	0
1	3	9	12	2	1	18
2	2	8	14	1	1	18
3	2	10	14	1	1	19
4	3	8	13	3	2	20
5	2	7	17	2	1	20
6	1	8	13	3	4	18
7	1	10	13	2	2	20

Table 25
Cigar Smoking Habits of Studied Group. (Question 20)

WEEK	10 or More	7-8	5-6	3-4	1-2	Occasionally	None
1	0	0	0	1	3	24	17
2	0	0	0	2	3	19	20
3	0	0	0	0	4	19	23
4	0	0	0	0	5	15	28
5	0	1	0	0	3	20	25
6	0	0	0	0	2	18	27
7	0	0	0	1	3	18	26

Table 26
Number of Pipesfull of Tobacco Smoked by Studied Group. (Question 21)

WEEK	More Than 8	8	6	4	2	Occasionally	None
1	3	0	1	1	0	17	23
2	2	1	4	1	1	11	24
3	1	1	1	2	2	11	29
4	1	2	1	0	2	7	36
5	1	1	1	1	1	8	36
6	1	0	1	0	1	7	37
7	0	1	2	2	0	8	35

Table 27
Number of Subjects Who Smoke Before Breakfast.
(Question 23)

WEEK	Smoke Before Breakfast	Do Not Smoke Before Breakfast
1	14	29
2	13	30
3	15	30
4	14	33
5	15	31
6	15	30
7	14	32

Table 28
Patrol Effects on Oral Health Status
(N-50)

	Periodontal Index	Debris Score
Prepatrol	.094*	.76
	±.017**	±.10
Beginning of patrol	.074	.30
	±.021	±.07
End of patrol	.058	.29
	±.010	±.07

*Mean

**Standard error of the mean

less than half of the test population was brushing their teeth after any one meal. If the dental profession is correct in saying that one must brush after every meal, this FBM crew does not practice proper oral hygiene.

The toothbrushing data in Table 23 is presented in a form identical to that used by Shiller (3,6) in previous cross-sectional surveys. The data from a survey of conventional submariners are given for comparison. Chi square analysis reveals highly significant differences between the toothbrushing frequencies of the conventional submariners and the crew of the NATHAN HALE ($P < .001$).

Tables 24 through 27 give the smoking habits in the studied group. Table 24 gives the cigarette smoking habits. No significant variations in packs per day occurred. Tables 25 and 26 give the cigar and pipe tobacco smoking habits. There is a slight decrease in usage of both as the patrol progresses. Table 27 gives the number of subjects who smoke before breakfast. There is no significant variation during the patrol.

Table 28 summarizes the results of the three examinations. There is a progressive but not significant decrease in gingivitis as the patrol progresses. There is a significant decrease in the debris score as the patrol progresses ($P < .05$). The averages of the periodontal indices are so small that comparisons are almost meaningless. One could almost summarize that data by saying that essentially no gingivitis was present as the patrol progressed.

An attempt was made to examine the relationship between debris and gingivitis and the dietary habits. It was discovered that only at the first examination were there enough subjects with any debris or gingivitis to permit any statistical analysis. This evaluation period was, therefore, the only one analyzed for relationships. No significant relationships were found between response on the questionnaires and the amount of debris or gingivitis present.

CONCLUSIONS

The overall dietary habits of FBM submariners do not seem remarkable. Actually, very few individuals eat between meals. The carbohydrate intake of these men is not abnormally high. When looking at the diet of FBM submariners, one can safely say that it does not show any significant variation from what is generally considered to be a normally rounded diet.

The patrol does not seem to affect toothbrushing frequency. The overall toothbrushing habits of the FBM submariner are much better than those of his conventional submarine counterparts. The reasons for this difference have not been investigated, but Martin (2) suggested that the poor habits of conventional submariners may be due to limited physical facilities of the conventional submarine. Certainly the physical facilities of the FBM are more adequate.

Tobacco smoking habits do not show significant variances as the patrol progresses.

The significant decrease in the debris scores indicates either better hygiene or a more desirable diet as the patrol progresses. Neither factor seems to have changed significantly, however. The fact no relationships could be discovered between the presence of debris or gingivitis and any of the questionnaire responses is probably merely the result of the fact that oral hygiene practices were so favorable that these indicators of dental problems were virtually eliminated.

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Name _____ Rate _____ Service _____
Number: _____

1. This morning did you eat the regularly served breakfast? Yes No
2. Which of the following did you eat for breakfast?
- | | | |
|-----------|---------------------|----------------|
| a. A meat | c. Toast | e. Sweet rolls |
| b. Eggs | d. A fruit or juice | f. Cereal |
3. Did you eat anything between breakfast and lunch? Yes No
4. How many or how many helpings did you eat of the following between breakfast and lunch?
- | | | |
|-------------------|---------------------|-------------------|
| _____ Sweet rolls | _____ Crackers | _____ Ice cream |
| _____ Candy | _____ Peanut butter | _____ Nuts |
| _____ Cookies | _____ Fruit | _____ Chewing gum |
| _____ Cake or pie | _____ Sandwich | _____ Soup |
5. Did you eat the regularly served lunch? Yes No
6. What lunch dish did you like best? _____
7. What lunch dish did you like least? _____
8. Did you eat anything between lunch and supper? Yes No
9. How many or how many helpings did you eat of the following between lunch and supper?
- | | | |
|-------------------|---------------------|-------------------|
| _____ Sweet rolls | _____ Crackers | _____ Ice cream |
| _____ Candy | _____ Peanut butter | _____ Nuts |
| _____ Cookies | _____ Fruit | _____ Chewing gum |
| _____ Cake or Pie | _____ Sandwich | _____ Soup |
10. Did you eat the regularly served dinner/supper? Yes No
11. What supper dish did you like most? _____
12. What supper dish did you like least? _____
13. Did you eat anything after supper? Yes No
14. How many or how many helpings of the following did you eat after supper?
- | | | | |
|-------------------|---------------------|-----------------|-------------------|
| _____ Sweet rolls | _____ Cake or Pie | _____ Fruit | _____ Nuts |
| _____ Candy | _____ Crackers | _____ Sandwich | _____ Chewing gum |
| _____ Cookies | _____ Peanut butter | _____ Ice cream | _____ Soup |
15. When did you brush your teeth today?
- | | | | |
|---------------------|-----------------|------------------|-------------------|
| a. Didn't brush | d. Mid morning | g. Mid afternoon | j. Before bedtime |
| b. Before breakfast | e. Before lunch | h. Before dinner | |
| c. After breakfast | f. After lunch | i. After dinner | |

continues on
next page

Name _____ Date: _____
 Rate _____ Service _____
 Number: _____

Eating and Drinking Habits

1. On the average, how many cups of liquid have you drunk per day during the past week? (Include water, coffee, milk, etc.). 1 glass = 1 cup; one trip to the scuttlebut = 1 cup.
 - a. 20 cups or more b. 16 cups c. 12 cups d. 8 cups e. 4 cups or less
2. How has your appetite been the last month?
 - a. Much better than usual d. Somewhat poorer than usual
 - b. Somewhat better than usual e. Much poorer than usual
 - c. No different than usual
3. Have you needed to drink liquids to wash down dry food?
 - a. All the time d. Almost never
 - b. Almost all the time e. Never
 - c. Sometimes
4. Do you take vitamins?
 - a. Each day c. 2 times a week e. Never
 - b. 3 times a week d. Once a week
5. Do you eat between meals?
 - a. Each day b. Almost every day c. Almost never d. Never
6. Have you eaten candy or had soft drinks -
 - a. Each day b. Almost every day c. Almost never d. Never
7. Did you chew gum -
 - a. Each day b. Almost every day c. Almost never d. Never
8. How many cups of cocoa do you drink?
 - a. 5 or more each day d. Less than 1 each day
 - b. 3-4 each day e. None
 - c. 1-2 each day
9. How much coffee or tea do you drink?
 - a. More than 10 cups each day d. 5-6 cups g. Less than 1 cup
 - b. 9-10 cups e. 3-4 cups h. None
 - c. 7-8 cups f. 1-2 cups

10. How much sugar do you use in each cup of coffee or tea?

- a. 4 teaspoons b. 3 teaspoons c. 2 teaspoons d. 1 teaspoon e. none

11. How much cream do you use in each cup of coffee or tea?

- a. A lot of cream b. Moderate amount of cream c. Very little cream d. none

12. If you could order dinner from the below menu, what would your choices be?

a. Appetizer (choice of 1)

- ☐ Kadota figs
☐ Seafood cocktail
☐ Herring and sour cream

b. Salad (choice of 1)

- ☐ Tomato aspic salad
☐ Avocado salad
☐ Red kidney bean salad

c. Soup (choice of 1)

- ☐ Heavy cream of tomato
☐ Beef broth
☐ Potato soup

d. Entree (choice of 1)

- ☐ Spaghetti with tomato sauce
☐ Cold cuts of meat
☐ Fried pork sausages

e. Vegetables (choice of 2)

- ☐ Rice
☐ Spinach
☐ Buttered carrot sticks
☐ Boiled cabbage
☐ Corn
☐ Buttered broccoli
☐ Boiled potatoes

f. Beverage (choice of 1)

- ☐ Black coffee
☐ Coffee with sugar
☐ Coffee with cream

g. Desserts (choice of 1)

- ☐ Banana pudding
☐ Assorted cheeses
☐ Assorted nuts

Smoking Habits

13. How many cigarettes do you smoke each day?

- a. Over 2 packs c. About a pack e. Less than $\frac{1}{2}$ pack
b. Over a pack d. About $\frac{1}{2}$ pack f. None

14. How many cigars do you smoke each day?

- a. 10 or over c. 5-6 e. 1-2 g. Never
b. 7-8 d. 3-4 f. Only occasionally

15. How many pipefuls of tobacco do you smoke each day?

- a. Over 8 b. 8 c. 6 d. 4 e. 2 f. only occasionally g. never

16. Do you feel that your smoking has increased in the past week? YES NO DON'T KNOW

17. Do you routinely smoke before breakfast? YES NO

18. How many years have you been smoking?

Over 10 years - 5-10 yrs. - 2-4 yrs. - 1 year - Less than 1 year - Not at all

19. Do you chew tobacco? Yes, routinely; Occasionally; Never

20. How often do you brush your teeth?

- a. Seldom c. At least once each day e. Three or more times a day
b. Usually one time each day d. Twice each day

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13. ABSTRACT

Some previous reports indicated that submarine crewmen eat abnormally high amounts of carbohydrates and that their diet habits include many between meal snacks. If true, these facts would lead one to expect great oral health problems in submariners; particularly in those on patrol for long periods. A detailed dietary and oral health study was done aboard the USS NATHAN HALE (SSBN 623) to evaluate the problem.

The findings essentially disprove the previously reported beliefs. It was found that the FBW crew ate an essentially well rounded diet with only a moderate amount of between meal snacking.

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